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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/262,000	03/05/1999	SIK ON KONG	CS98-076	8744

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EXAMINER

VOCKRODT, JEFF B

ART UNIT PAPER NUMBER

2822

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/262,000

Applicant(s)

KONG ET AL.

Examiner

Jeff Vockrodt

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8, 14-16, 18-23, 25-28, 30-32 and 38-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8, 14-16, 18-23 and 38 is/are allowed.
- 6) ☒ Claim(s) 30-32, 39 and 40 is/are rejected.
- 7) ☒ Claim(s) 25-28 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

This office action is in response to the amendment filed on September 8, 2003. Claims 8, 14-16, 18-23, 25-28, 30-32, and 38-40 are pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 32, which depends from claim 40, requires "removing said photoresist mask." The "photoresist mask" previously recited in claim 40 is removed just after patterning the metal layer. It is unclear how the photoresist mask can again be removed in connection with the steps recited in claim 32. It is unclear whether a second photoresist mask is being claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,027,999 ("Wong") in view of U.S. Pat. No. 6,124,912 ("Moore") and U.S. Pat. No. 6,266,121 ("Shigeta").

Wong teaches a method of forming a reflective LCD that positions a LCD standoff on a passivation layer that covers the reflective surface comprising the steps of:

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providing a silicon wafer 10 having a pattern of active device structures therein and thereon;

forming a first metallic layer 20 over the said silicon oxide 18 (this limitation lacks antecedent basis);

forming a second metallic layer 32 over the said silicon oxide 24, which is used both for connections 32 and for bonding pads 30;

forming a silicon oxide insulation 36 over the said second metal layer 32;

forming a third metallic layer 42 over the surface of said layer of silicon dioxide 36;

forming a photoresist mask (not shown) over the said third metallic layer 42 having a covering over the planned pixel locations 42 of the said liquid-crystal-on-silicon display device;

removing the said third metallic layer not covered by the said photoresist mask (not shown);

removing the said photoresist (not shown) mask to provide that each said pixel retains said metallic layer 42, which shall act as a mirror reflector for the light incident upon said liquid-crystal-on-silicon display device; and

depositing a passivation layer on the pixels 42.

Wong differs from the claimed invention by not teaching depositing optical interference layers over said third metallic layer 42 and said silicon dioxide layer 36.

Moore teaches an improvement on reflective LCDs that have a passivation layer above a reflective pixel layer wherein the passivation layer is replaced with a layer of silicon oxide 233 /silicon nitride 232 /silicon oxide 231 /silicon nitride 230 over the reflector and the oxide layer that underlies the reflector. This quarter wave stack having four dielectric layers creates constructive interference which increases the reflectance of the pixel. Moore, col. 3, ll. 32-42.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the passivation layer of Wong with the quarter wave stack of Moore to increase the reflectance of the pixel as taught by Moore.

Claim 39 differs from the collective teaching of Wong and Moore by requiring "forming said alignment post by the process of insulation material by lift-off upon said optical interference layer OIL." Shigeta teaches forming spacers (76) on top of insulating layers (73,74) overlying electrodes in a LCD device using a lift-off process. Specifically, photoresist (75) is deposited on the insulating layer (74) and patterned to form voids (83) (Fig. 23(b)). Shape memory polyurethane is deposited in the voids (83) and the photoresist (75) is removed (lifted-off) to leave spacers (76) at patterned locations (Fig. 23(c)). One of ordinary skill in the art would recognize that Shigeta's process allows precise placement of spacers on a substrate relative to electrodes and enables formation of spacers out of particular materials.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a lift-off patterning process in the process of Wong and Moore to allow for precise placement of spacers on the substrate relative to the electrode and enable formation of spacers out of particular materials as suggested by Shigeta.

Claims 30-32 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,027,999 ("Wong") in view of U.S. Pat. No. 6,124,912 ("Moore"), U.S. Pat. No. 4,763,995 ("Katagiri"), and U.S. Pat. No. 6,449,024 ("Hirakata").

Wong teaches a method of forming a reflective LCD that positions a LCD standoff on a passivation layer that covers the reflective surface comprising the steps of:

providing a silicon wafer 10 having a pattern of active device structures therein and thereon;

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forming a first metallic layer 20 over the said silicon oxide 18 (this limitation lacks antecedent basis);

forming a second metallic layer 32 over the said silicon oxide 24, which is used both for connections 32 and for bonding pads 30;

forming a silicon oxide insulation 36 over the said second metal layer 32;

forming a third metallic layer 42 over the surface of said layer of silicon dioxide 36;

forming a photoresist mask (not shown) over the said third metallic layer 42 having a covering over the planned pixel locations 42 of the said liquid-crystal-on-silicon display device;

removing the said third metallic layer not covered by the said photoresist mask (not shown);

removing the said photoresist (not shown) mask to provide that each said pixel retains said metallic layer 42, which shall act as a mirror reflector for the light incident upon said liquid-crystal-on-silicon display device; and

depositing a passivation layer on the pixels 42.

Wong differs from the claimed invention by not teaching depositing optical interference layers over said third metallic layer 42 and said silicon dioxide layer 36.

Moore teaches an improvement on reflective LCDs that have a passivation layer above a reflective pixel layer wherein the passivation layer is replaced with a layer of silicon oxide 233 /silicon nitride 232 /silicon oxide 231 /silicon nitride 230 over the reflector and the oxide layer that underlies the reflector. This quarter wave stack having four dielectric layers creates constructive interference which increases the reflectance of the pixel. Moore, col. 3, ll. 32-42.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the passivation layer of Wong with the quarter wave stack of Moore to increase the reflectance of the pixel as taught by Moore.

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Claim 40 differs from the collective teaching of Wong and Moore by requiring "forming said alignment post by a process of polyimide by photosensitive etching upon an Optical Interference Layer (OIL)." Katagiri teaches that pillar or wall shaped spacers formed over insulating layers and electrodes were known to be made from photosensitive polyimide (col. 7, ll. 40-60). Hirakata (cited to show how to pattern the photosensitive polyimide of Katagiri) teaches patterning photosensitive polyimide into spacers (Fig. 7B) using a photosensitive etching technique whereby photolithographic exposure of the polyimide changes the solubility of the polyimide (col. 18, ll. 57-64). One of ordinary skill in the art would recognize that using photosensitive polyimide eliminates one step from the conventional depositing of depositing a patterning material and a photoresist on the patterning material.

It would have been obvious to one of ordinary skill in the art at the time of the invention to form the alignment post (spacer) by a process of polyimide by photosensitive etching upon an Optical Interference Layer (OIL) such as taught by Moore in the process of Wong and Moore. One of ordinary skill in the art would have been motivated to form spacers from photosensitive polyimide in this manner to reduce the number of manufacturing steps.

Claim 30 depends on claim 40 and further requires a photosensitive layer thickness of "between about 0.1 and 5 microns". The term "about" modifies both the upper and lower range. Hirakata teaches a thickness of 6 microns for forming a polyimide wall that is used as a LCD standoff, which comes within the claimed "between about 0.1 and 5 microns" (emphasis added). Claims 31-32 are met by Hirakata, which teaches patterning a photosensitive polyimide with a photoresist mask (col. 18, ll. 57-64).

Allowable Subject Matter

Independent claims 8 and 38 allowed. Claims 14-16 and 18-23 are allowable as they depend from claims 8 and 38 respectively.

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Claims 25-28 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Specifically, Shigeta was cited as supplying a photoresist spacer to meet the insulating layer limitation of claim 39. Claim 25 further requires using silicon monoxide in connection with a bottom photoresist and another photoresist. None of the references of record teach or suggest modifying Shigeta to arrive at all of the limitations of claim 25.

Response to Arguments

Applicant's arguments filed 9-8-03 have been fully considered but they are not persuasive.

Applicant argues the rejection of claim 39 under 35 U.S.C. § 103. Applicant attempts to distinguish Moore by stating:

This application differs considerably from the application of the optical interference layers that are provided by the claimed invention since the layer that is provided by Moore is designed to provide optimum reflection performance characteristics while the optical interference layers that are provided by the claimed invention are provided to provide optimum light transmission performance characteristics.

(9-8-03 response, pp. 23-24, emphasis in original). Interestingly, page 9, last paragraph of the specification states "[o]ptical interference layers are used to improve light reflections."

Applicant's remarks are inconsistent with the specification and are therefore unpersuasive.

The examiner disagrees that optical layers fall within a different category of materials than passivation layers. The disclosed invention, Moore, and Wong all utilize silicon nitride/silicon oxide layers to coat the pixels. Moore teaches that by selecting the relative thickness of these nitride and oxide layers, the reflectivity of the pixels may be enhanced. These similar materials are coated onto the surface of the reflecting electrodes, thus using the teaching of Moore to increase the reflectance of the nitride/oxide layers in Wong is suggested by the prior art.

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Applicant argues that Shigeta is not pertinent art because there are certain differences between it and the claimed invention. Shigeta teaches a particular process patterning stand-offs which are elements that are common to all LCDs reflective and non-reflective. Shigeta is reasonably related to the problem of forming standoffs. Applicant has put forth no cogent reasoning why standoffs are not common features between reflective and non-reflective LCDs.

Applicant argues that no single reference teaches the overall combination. This misunderstands the nature of §103, which allows for rejection of obvious claims when no single reference anticipates.

Applicant argues the rejection of claim 40 under 35 U.S.C. § 103. The above response to arguments in connection with claim 39 addresses applicants arguments made in connection with claim 40.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP. § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

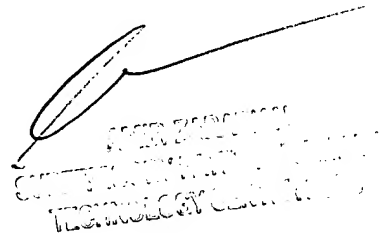
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Any inquiry concerning communications from the examiner should be directed to Jeff Vockrodt at (703) 306-9144 who can be reached on weekdays from 9:30 am to 5:00 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached at (703) 308-4905.

The fax number for this group is 703-872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-0956.

December 1, 2003

J. Vockrodt



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